Philosophical Magazine

First Published in 1798

Physics of Condensed Matter

A Defects and Mechanical Properties

B Structural, Electronic, Optical and Magnetic Properties

Recognized by the European Physical Society

Taylor & Francis
London • Washington, DC

PHILOSOPHICAL MAGAZINE A

Editor

Professor E. A. Davis — Department of Physics and Astronomy, University of Leicester, U.K.

North American Editor

Dr J. L. Smith — Los Alamos National Laboratory, U.S.A.

Associate Editors

Professor D. J. Bacon — Department of Materials Science and Engineering, University of Liverpool, U.K.

Dr S. R. Elliott — Department of Physical Chemistry, University of Cambridge, U.K.

Dr M. J. Goringe *and* Dr. M. L. Jenkins — Department of Materials, University of Oxford, U.K.

Dr A. B. Lidiard — Department of Theoretical Chemistry, University of Oxford, U.K.

Dr W. M. Stobbs — Department of Materials Science and Metallurgy, University of Cambridge, U.K.

Dr D. D. Vvedensky — Blackett Laboratory, Imperial College, U.K.

Regional Editors

Dr C. Ayache — Laboratoire de Cryophysique, Centre d'Études Nucléaires de Grenoble, France

Professor R. M. Bradley — Department of Physics, Colorado State University, U.S.A.

Dr D. J. H. Cockayne — Electron Microscope Unit, University of Sydney, Australia

Dr M. Duesbery — Naval Research Laboratory, Washington, U.S.A.

Professor J. D. Embury — Department of Materials Science and Engineering, McMaster University, Canada

Professor Dr E. O. Göbel — Fachbereich Physik, Philipps-Universität Marburg, F.R.G.

Professor F. Hensel — Fach Physikalische Chemie, Philipps-Universität Marburg, F.R.G.

Dr M. Kléman — Laboratoire de Physique des Solides, Université de Paris-Sud, France

Professor K. Morigaki — Institute of Solid State Physics, University of Tokyo, Japan

Professor C. N. R. Rao — Solid State and Structural Chemistry Unit, Bangalore, India

Professor Dr W. Schilling — Institut für Festkörperforschung der Kernforschungsanläge Jülich, F.R.G.

Dr C. Schlenker — Laboratoire d'Études des Propriétés Électroniques des Solides, CNRS-Grenoble, France

Professor A. Seeger — Institut für Physik, Max-Planck-Institut für Metallforschung, Stuttgart, F.R.G.

Dr V. Smid — Institute of Physics, Czechoslovak Academy of Science, Praha, Czechoslovakia

Dr R. A. Street — Palo Alto Research Center, Xerox Corporation, U.S.A.

Dr M. Tosi — ICTP, Trieste, Italy

Professor U. Valdrè — Dipartimento di Fisica, Università di Bologna, Italy

Professor V. Vitek — Department of Materials Science and Engineering, University of Pennsylvania, U.S.A.

Consultant Editor

Professor Sir Nevill Mott — Cavendish Laboratory, University of Cambridge, U.K.

Book Review Editor

Dr E. Marseglia — Cavendish Laboratory, University of Cambridge, U.K.

Subscription Information

Philosophical Magazine A (*ISSN 0141-8610*) is published monthly by Taylor & Francis Ltd, 4 John Street, London WC1N 2ET, UK.

Annual Subscription 1991 £650 US$1125.

Second class postage paid at Jamaica, New York 11431. USA Postmasters: Send address changes to *Philosophical Magazine*, Publications Expediting Inc., 200 Meachan Avenue, Elmont, New York 11003. Air freight and mailing in the USA by Publications Expediting Inc., 200 Meacham Avenue, Elmont, New York 11003.

Printed in UK by Burgess Science Press, Rankine Road, Basingstoke, Hampshire RG24 0PR, UK. The paper used in this publication has a specified pH value on final manufacture of not less than 7·5 and is therefore 'acid free'.

Subscription prices includes parts A and B and Letters, none of which is available separately. Dollar rates apply to subscribers in all countries except the UK and the Republic of Ireland where the pound sterling price applies. All subscriptions are payable in advance and all rates include postage. Journals are sent by air to the USA, Canada, Mexico, India, Japan and Australasia. Subscriptions are entered on an annual basis, i.e. January to December. Payment may be made by sterling cheque, dollar cheque, international money order, National Giro, or credit card (Amex, Visa, Mastercard/Access).

Orders originating in the following territories should be sent direct to the local distributor. **Australia:** R. Hill & Son Ltd, Suite 2, 119 Gardenvale Road, Gardenvale, Victoria, 3185. **New Zealand:** R. Hill & Son Ltd, Private Bag, Newmarket, Auckland 1. **India:** Universal Subscription Agency Pvt. Ltd, 101–102 Community Centre, Malviya Nagar Extn, Post Bag No. 8, Saket, New Delhi 110017. **Japan:** Kinokuniya Company Ltd, Journal Department, PO Box 55, Chitose, Tokyo 156. **USA, Canada and Mexico:** Taylor & Francis, Inc., 1900 Frost Road, Suite 101, Bristol, Pennsylvania 19007. **UK and all other territories:** Taylor & Francis Ltd, Rankine Road, Basingstoke, Hampshire RG24 0PR.

CONTENTS OF VOL. 63 Nos 1–6

NUMBER 1—JANUARY

PART A

PAGE

A study of the initial stages of the oxidation of silicon using the Fresnel method
By F. M. Ross and W. M. Stobbs 1

Computer modelling for Fresnel contrast analysis
By F. M. Ross and W. M. Stobbs 37

An electron microscope study of the origin of latent hardening in NaCl
By F. Appel 71

The dependence of creep on stacking-fault energy
By Yang Zhi'an and Wang Zhongguang 87

Lattice spacing measurements around dislocations in an undoped GaAs crystal grown by the liquid-encapsulated Czochralski method
By Tomohisa Kitano, Tetsuya Ishikawa and Junji Matsui 95

Dislocation emission from crack tips
By G. Schoeck 111

Dislocations in titanium diboride
By L. Wang and R. J. Arsenault 121

Crack-tip strain fields and fracture microplasticity in hydrogen-induced cracking of Fe–3 wt% Si single crystals
By S. H. Chen, Y. Katz and W. W. Gerberich 131

PART B

Editorial 1

The sign of the Hall effect in amorphous silicon
By N. F. Mott 3

Urbach tails in absorption spectra of amorphous and crystalline SiO_2
By C. Bosio and W. Czaja 7

Optical absorption in As–Se glasses
By J. Pétursson, J. M. Marshall and A. E. Owen 15

Persistent photoconductance in a-Si:H/a-SiN_x:H multilayers
By A. Hamed and H. Fritsche 33

PAGE

Electronic structure of silicon nitride
By J. ROBERTSON 47

On the structural, optical and electronic properties of microcrystalline Si:O:C:H thin films prepared in a two-consecutive-decomposition–deposition-chamber system
By G. WILLEKE and R. MARTINS 79

Control of nucleation and growth in the preparation of crystals by plasma-enhanced chemical vapour deposition
By MASAMI NAKATA, AKIRA SAKAI, TAKUYA UEMATSU, TATSURU NAMIKAWA, HAJIME SHIRAI, JUN-ICHI HANNA and ISAMU SHIMIZU 87

Experimental tests of the autocompensation model of doping
By B. G. KRÖTZ, J. WIND, H. STITZL, G. MÜLLER, S. KALBITZER, and H. MANNSPERGER 101

On the mechanism of doping and defect formation in a-Si:H
By K. PIERZ, W. FUHS and H. MELL 123

Studies by photothermal deflection spectroscopy of defect formation in a-Si:H
By M. L. THÈYE, L. CHAHED, P. ROCA I CABARROCAS and K. ZELLAMA 143

Molybdenum impurity states in amorphous silicon and related materials
By M. STUTZMANN, and J. STUKE 151

Optically induced metastable defects in undoped a-Si:H
By S. YAMASAKI, J. ISOYA and K. TANAKA 163

Temperature and current dependence of electroluminescence in a-Si:H
By KEDA WANG, DAXING HAN, M. E. ZVANUT and M. SILVER 175

On the low-temperature efficiency of photoluminescence in a-Si:H and other materials
By T. M. SEARLE, M. HOPKINSON, W. A. JACKSON, A. J. RHODES and G. K. DIPROSE 179

Theoretical studies of the low-temperature drift mobility in a-Si:H
By V. HEUCKEROTH, H. OVERHOF, R. SCHUMACHER and P. THOMAS 193

Common features in the transport behaviour of diverse glassy solids: exploring the role of disorder
By M. ABKOWITZ, H. BÄßLER and M. STOLKA 201

Solution of the $\mu\tau$ problem in a-Si:H
By J. KOČKA, C. E. NEBEL and C. D. ABEL 221

Studies on the structure of a-Ge:H using differential scanning calorimetry, gas evolution on heating and transmission electron microscopy
By W. PAUL, S. J. JONES and W. A. TURNER 247

PAGE

Hydrogen stability in amorphous germanium films
By W. Beyer, J. Herion, H. Wagner and U. Zastrow 269

Control of photodegradation in amorphous silicon: the effect of deuterium
By Gautam Ganguly, Satoshi Yamasaki and Akihisa Matsuda..... 281

An argument for potential fluctuations in amorphous-silicon-based alloys, and their effect on solar cell performance
By B. von Roedern and A. Madan..... 293

Multijunction amorphous silicon solar cells
By D. E. Carlson..... 305

High-quality a-Si and its application to solar cells
By Yukinori Kuwano and Noboru Nakamura 315

A defect-pool model for near-interface states in amorphous silicon thin-film transistors
By M. J. Powell, S. C. Deane, I. D. French, J. R. Hughes and W. I. Milne..... 325

The physics of amorphous silicon thin-film devices and their application to document processing
By H. Steemers, M. Hack, R. Weisfield, Hsing Tuan and M. Thompson..... 337

Analogue memory and ballistic electron effects in metal–amorphous silicon structures
By J. Hajto, A. E. Owen, A. J. Snell, P. G. Le Comber and M. J. Rose 349

NUMBER 2—FEBRUARY

PART A

Solute-and-dumbbell defect diffusion in b.c.c. lattices
By J. L. Bocquet..... 157

High-resolution structure imaging of stacking sequences in $Y_2Fe_{17}C_x$ ($0{\cdot}6 \leqslant x \leqslant 1{\cdot}6$) magnetic material
By W. Coene, F. Hakkens, T. H. Jacobs and K. H. J. Buschow..... 185

The interaction of non-glissile superdislocations and a coherent twin boundary in ordered Cu_3Au
By F. D. Tichelaar and F. W. Schapink 207

Twin boundary energies in $YBa_2Cu_3O_{7-x}$ and La_2CuO_4
By T. Roy and T. E. Mitchell..... 225

Structural multiplicity observed at a $\Sigma = 5/[001]$ 53·1° tilt boundary in gold
By W. Krakow..... 233

PAGE

On the structure of faulted interfaces in aluminium nitride ceramics
By S. HAGÈGE and Y. ISHIDA 241

HRTEM study of a Cu/Al_2O_3 interface
By F. ERNST, P. PIROUZ and A. H. HEUER 259

Accommodation of misfit during the initial growth of GaAs on {111}-Si
By C. B. CARTER, G. ANDERSON and F. PONCE 279

On the formation of vacancy type dislocation loops from displacement cascades in nickel
By I. M. ROBERTSON, J. S. VETRANO, M. A. KIRK and M. L. JENKINS 299

Slip-plane disordering in stoichiometric Ni_3Al
By J. A. HORTON, I. BAKER and M. H. YOO 319

Correlation between structure, energy and surface tension for free surfaces in b.c.c. metals
By D. WOLF 337

The necessity of both plasticity and brittleness in the fracture thresholds of iron
By W. W. GERBERICH, R. A. ORIANI, M.-J. LII, X. CHEN and T. FOECKE 363

PART B

Composition measurement by thickness fringe matching: the alloy-system-dependent sensitivity and accuracy of the method
By E. G. BITHELL and W. M. STOBBS 371

Contact-injected currents in polyvinylcarbazole
By G. AKUETEY and J. HIRSCH 389

Magnetic after-effect of hydrogen isotopes in ordered and disordered Fe_3Pt alloys
By C. U. MAIER, M. HIRSCHER and H. KRONMÜLLER 405

Electrical resistivity, transverse magnetoresistance and Hall coefficient in pyrolytic carbon: correlation with interlayer spacing d_{002}
By YUTAKA KABURAGI, R. H. BRAGG and YOSHIHIRO HISHIYAMA 417

Origin of the low-temperature drift mobility increase in a-Si:H
By M. KEMP and M. SILVER 437

Grain-boundary states and hydrogenation of fine-grained polycrystalline silicon films deposited by molecular beams
By D. JOUSSE, S. L. DELAGE and S. S. IYER 443

Structural studies of amorphous Ge–Au alloys
By A. M. EDWARDS, M. C. FAIRBANKS and R. J. NEWPORT 457

Charge-induced structural relaxation in amorphous semiconductors
By G. MÜLLER 465

Polaronic transport in iron-vanadate glassy semiconductors
By A. GHOSH 477

PAGE

Phason strain in the crystallization of icosahedral AlMnSi
By Z. R. HUANG, K. K. FUNG and Y. Q. ZHOU 485

Studies of glass transition temperature and thermal diffusivity in As–Sb–Se glasses
By K. NANDAKUMAR and J. PHILIP 493

Urbach tails in chalcogenides: a self-consistent approach
By L. FERRARI and G. RUSSO 501

On the six-dimensional lattice of the decagonal phase
By R. K. MANDAL and S. LELE 513

Recombination at correlated dangling bonds and the effects of Fermi level position on steady-state photoconductivity in amorphous silicon
By E. MORGADO 529

Analysis of high-frequency capacitance of amorphous silicon–crystalline silicon heterojunctions
By D. K. SHARMA and K. L. NARASIMHAN 543

Applicability of the ratchet model to the polarization of charge density waves below the threshold field
By J. B. SOKOLOFF and I. WEBMAN 551

An X-ray absorption study of barrier-type anodic films formed on aluminium in chromate electrolytes
By S. W. M. CHUNG, J. ROBINSON, G. E. THOMPSON, G. C. WOOD and H. S. ISAACS 557

Nature of electrical transport in ambipolar amorphous semiconductors $(PbS)_x(GeS)_{0.7-x}(GeS_2)_{0.3}$
By S. K. MALIK, K. L. BHATIA and V. K. BHATNAGAR 573

A comment on the use of calorimetry for the determination of the structure of amorphous materials
By LI-CHYONG CHEN and F. SPAEPEN 585

NUMBER 3—MARCH

PART A

High-temperature plastic deformation of Y_2O_3-stabilized ZrO_2 single crystals III. Variation in work hardening between 1200 and 1500°C
By D.-S. CHEONG, A. DOMINGUEZ-RODRIGUEZ and A. H. HEUER 377

The decomposition process of rapidly solidified Ti–25 at.% Al–25 at.% Nb
By C. P. CHANG and M. H. LORETTO 389

Exhaustion of $a[10\bar{1}](111)$ slip to explain the strength anomaly in $Ni_3(Al, Ti)$
By A. KORNER 407

A TEM investigation of the effect of annealing on single-crystal silicon/oxide/polycrystalline silicon interfaces
By A. ALBU-YARON, J. C. BARRY and G. R. BOOKER 423

Diffusion of ^{99}Mo in vanadium
By J. PELLEG and Y. ZAKLOS 439

PAGE

The effect of lattice misfit on the interface structure of γ-Ag_2Al precipitates during dissolution
By K. K. Sagoe-Crentsil and L. C. Brown 447

Transmission electron microscopy observations of the f.c.c.-to-h.c.p. martensite transformation in Co–Ni alloys
By C. Hayzelden, K. Chattopadhyay, J. C. Barry and B. Cantor 461

Interactions of misfit dislocations in $In_xGa_{1-x}As/GaAs$ interfaces
By A. Lefebvre, C. Herbeaux and J. Di Persio 471

A high-resolution electron microscopy study of silver particles and surfaces
By J.-O. Malm, G. Schmid and B. Morun 487

Interpretation of HRTEM images of interfaces containing misfit dislocations lying parallel to the surface of the sample
By D. R. Rasmussen and C. B. Carter 503

Dopant redistribution during annealing of amorphized Si⟨111⟩
By R. Turan and T. G. Finstad 519

Shear modulus and internal friction in nanometre-sized polycrystalline palladium
By M. Weller, J. Diehl and H.-E. Schaefer 527

The interaction of dislocations with coherent inclusions. I. Perfect edge and screw dislocations
By M. S. Duesbery and K. Sadananda 535

Room-temperature deformation of single-crystal B2 Fe–Al alloys: the effect of stoichiometry and cooling rate
By M. A. Crimp and K. Vedula 559

Interaction of impurities with dislocation cores in silicon
By M. Heggie, R. Jones and A. Umerski 571

The effect of stress on soft modes for the phase transformation in a Ti–Ni alloy. I. The stress-induced transformation and soft modes
By D. Y. Li, X. F. Wu and T. Ko 585

The effect of stress on soft modes for the phase transformation in a Ti–Ni alloy. II. Effects of ageing and thermal cycling on the phase transformation
By D. Y. Li, X. F. Wu and T. Ko 603

PART B

Anomalous time-independent diffusion of charge carriers in a random potential under a bias field
By L. Pautmeier, R. Richert and H. Bässler 587

***N*-body interatomic potentials for hexagonal close-packed metals**
By M. Igarashi, M. Khantha and V. Vitek 603

Transmission electron microscopic investigations of rapidly solidified Al–Mn–Ni quasicrystalline alloys
By N. P. Lalla, R. S. Tiwari and O. N. Srivastava 629

PAGE

The quantum simulation of metal–hydrogen systems and the analysis of diffraction experiments
By F. CHRISTODOULOS and M. J. GILLAN 641

Electronic structure of defect complexes in crystalline and amorphous GaAs
By BAL K. AGRAWAL, S. AGRAWAL, P. S. YADAV, J. S. NEGI and S. KUMAR 657

Equilibrium faceting shape of quasicrystals at low temperatures: cluster model
By T. LEI and C. L. HENLEY 677

Decagonal and related phases in Al–Mn alloys: electron diffraction and microstructure
By T. L. DAULTON, K. F. KELTON and P. C. GIBBONS 687

Electron irradiation effects in amorphous antimony thin films obtained by cluster-beam deposition
By G. FUCHS, M. TREILLEUX, F. SANTOS AIRES, B. CABAUD, P. MELINON and A. HOAREAU 715

Effects of electronic energy loss in crystalline and amorphous Ni_3B irradiated with high-energy heavy ions
By A. AUDOUARD, E. BALANZAT, J. C. JOUSSET, A. CHAMBEROD, G. FUCHS, D. LESUEUR, and L. THOMÉ 727

Interpretation of recent transient on-state data in thin chalcogenide glass and NbO_2 threshold switching material
By G. C. VEZZOLI, P. J. WALSH and M. A. SHOGA 739

Dielectric studies of the transition of ice Ih to ice XI
By A. V. ZARETSKII, R. HOWE and R. W. WHITWORTH 757

High-resolution electron microscopy and microanalysis of CdS and CdTe quantum dots in glass matrices
By LI-CHI LIU, M. J. KIM, S. H. RISBUD and R. W. CARPENTER 769

Structure of the Rayleigh line wing in highly viscous liquids
By V. Z. GOCHIYAEV, V. K. MALINOVSKY, V. N. NOVIKOV, and A. P. SOKOLOV 777

Erratum 789

Book reviews 791

NUMBER 4—APRIL

PART A

Arcs of diffuse scattering from the new Fe–Ti–Si rapidly solidified alloy
By P. MANDAL, R. S. TIWARI and O. N. SRIVASTAVA 617

Martensitic transformations in ultra-fine particles of metals and alloys
By S. KAJIWARA, S. OHNO and K. HONMA 625

Comparison between calculated and experimental displacement fringe intensities on the faces of γ′ precipitate plates in an Al–4·2 at.% Ag alloy
By N. PRABHU and J. M. HOWE 645

PAGE

High-resolution electron microscopy of lattice defects in TiO_2 and SnO_2
By K. SUZUKI, M. ICHIHARA and S. TAKEUCHI 657

On epitaxial misorientations
By M. AINDOW and R. C. POND 667

Integranular corrosion of copper and α-Cu–Al alloy bicrystals
By M. YAMASHITA, T. MIMAKI, S. HASHIMOTO and S. MIURA 695

Stress corrosion cracking of [110] and [100] tilt boundaries of α-Cu–Al alloy
By M. YAMASHITA, T. MIMAKI, S. HASHIMOTO and S. MIURA 707

Transmission electron microscopy study on microstructures of an Al(Li, Cu, Mg, Zr)–SiC_w composite. I. Structural characterization of SiC whiskers and phases in an Al(Li, Cu, Mg, Zr)–SiC_w composite
By X. G. NING, H. G. XU, H. Q. YE, J. ZHU, K. Y. HU Y. X. LU and J. BI 727

A transmission electron microscopy study of the $\beta \rightarrow \alpha$-phase transformation of tin
By D. R. G. MITCHELL and S. E. DONNELLY 747

On the electron microscope contrast of doped semiconductor layers
By D. D. PEROVIC, G. C. WEATHERLY, R. F. EGERTON, D. C. HOUGHTON and T. E. JACKMAN 757

Internal-friction and electron microscopy studies of cold-worked single-crystal and polycrystalline titanium
By H. NUMAKURA, Y. MINONISHI and M. KOIWA 785

An analytic model for grain-boundary expansions and cleavage energies
By A. P. SUTTON 793

PART B

The effects of Plateau borders in the two-dimensional soap froth. I. Decoration lemma and diffusion theorem
By F. BOLTON and D. WEAIRE 795

Preparation of heavily doped polycrystalline and amorphous silicon films by evaporation
By F. GOESMANN, H. H. ROSCHER and R. LABUSCH 811

Metastable effects induced by thermal quenching in undoped amorphous silicon
By M. MEAUDRE, P. JENSEN and R. MEAUDRE 815

Infrared spectroscopy of hydrogenated silicon–sulphur alloys prepared by glow discharge
By S. AL-DALLAL, M. HAMMAN, S. M. AL-ALAWI, S. ALJISHI and A. BREITSCHWERDT 839

Reproducibility and stability in surface morphological evolution
By G. CARTER, I. V. KATARDJIEV and M. J. NOBES 849

PAGE

On the formation of twinned precipitates in Al–Ge alloys
By J. DOUIN, U. DAHMEN and K. H. WESTMACOTT 867

Microcrystallinity in 'X-ray amorphous' anodic Ta_2O_5
By K. SHIMIZU, G. E. THOMPSON, G. C. WOOD and K. KOBAYASHI 891

The temperature dependence of photoluminescence lifetimes in a-P_2Se, a-P_3Se and c-P_4Se_3
By D. WOLVERSON and M. BORT 901

Adatom–crystal interaction potentials.. Part 1: A tungsten adatom on a tungsten {110} substrate
By P. M. STOOP, J. H. VAN DER MERWE and M. W. H. BRAUN 907

Evidence of pre-thermalization trapping of positrons in neutron-irradiated silicon-doped gallium arsenide
By S. C. CREAMER, P. C. RICE-EVANS, G. A. GLEDHILL and J. D. COLLINS 923

TEM study on overlapped twins in GaAs crystal
By X. J. WU, F. H. LI and H. HASHIMOTO 931

Structure and properties of amorphous V_2O_5
By M. NABAVI, C. SANCHEZ and J. LIVAGE 941

Self-trapped excitons and interstitial–vacancy pairs in oxides
By A. SHLUGER, M. GEORGIEV and N. ITOH 955

Effect of contamination of quantitative X-ray microanalysis in the analytical electron microscope
By Z. HORITA, T. SANO and M. NEMOTO 965

High pressure study of the antiferromagnetic state of chromium alloys
By HANS D. HOCHHEIMER and R. MÜNCH 979

A structural investigation of the crystallization products of an amorphous Ni–P alloy
By M. L. SUI, K. LU and Y. Z. HE 993

A single-coupling-constant bond model for low-frequency Raman scattering and infrared absorption in glasses
By N. AHMAD and K. W. HUTT 1009

NUMBER 5—MAY

PART A

Papers from the Adriatico Research Conference on 'Defects in hexagonal-close-packed metals'

Editorial: Adriatico Research Conference on 'Defects in hexagonal-close-packed metals'
By D. J. BACON 819

PAGE

Collapse of displacement cascades in h.c.p. metals
By W. J. PHYTHIAN, C. A. ENGLISH, D. H. YELLEN and D. J. BACON 821

Microstructure evolution in h.c.p. metals during irradiation
By M. GRIFFITHS 835

Electrical resistivity measurements in cobalt and dilute cobalt alloys following low-temperature electron irradiation
By F. DWORSCHAK, H. J. BLYTHE and S. HABTETSION 849

Magnetic relaxation measurements in cobalt following low-temperature electron irradiation
By H. J. BLYTHE and F. DWORSCHAK 857

Many-body effects on calculated defect properties in h.c.p. metals
By R. A. JOHNSON 865

Computer simulation of vacancy properties in twin boundaries in h.c.p. metals
By N. DE DIEGO and D. J. BACON 873

Lattice defects in rare-earth metals
By P. VAJDA and J. N. DAOU 883

Rapid-pair-enhanced diffusion in α-Zr and its integration into the point-defect scenario in h.c.p. metals
By W. FRANK 897

Rate theory analysis of radiation damage effects near surfaces in hexagonal metals
By C. H. WOO 915

Point defects and sink strength in h.c.p. metals
By A. M. MONTI, A. SARCE, N. SMETNIANSKY-DE GRANDE, E. J. SAVINO and C. N. TOMÉ 925

Solute diffusion in α-Zr: Rutherford backscattering and secondary-ion mass spectrometry study
By G. M. HOOD, T. LAURSEN, J. A. JACKMAN, R. BELEC, R. J. SCHULTZ and J. L. WHITTON 937

Self-diffusion and fast cobalt impurity diffusion in the bulk and in grain boundaries of hexagonal titanium
By C. HERZIG, R. WILLECKE and K. VIEREGGE 949

Comparison between interphase- and grain-boundary diffusion in zirconium-based materials
By F. DYMENT, M. J. IRIBARREN, K. VIEREGGE and C. HERZIG 959

Hafnium diffusion in α-Ti
By M. BEHAR, F. DYMENT, R. A. PEREZ, J. H. R. DOS SANTOS, R. L. MALTEZ and E. J. SAVINO 967

PAGE

Topological discontinuities in hexagonal crystals
By R. C. POND 973

Deformation twinning in h.c.p. metals and alloys
By M. H. YOO and J. K. LEE 987

Computer simulation of twinning dislocation in magnesium using a many-body potential
By A. SERRA and D. J. BACON 1001

Grain-boundary strengthening associated with $\Sigma = 9$ near-coincidence boundary in $\langle 10\bar{1}0 \rangle$ twist zinc bicrystals at high temperatures
By T. WATANABE, M. YAMADA and S. KARASHIMA 1013

Observations of grain-boundary structure in zinc
By K. SHIN and A. H. KING 1023

The plasticity of titanium at low and medium temperatures
By S. NAKA, L. P. KUBIN and C. PERRIER 1035

Prismatic glide in divalent h.c.p. metals
By A. COURET, D. CAILLARD, W. PÜSCHL and G. SCHOECK 1045

Core structure of $\frac{1}{3}\langle 11\bar{2}0 \rangle$ screw dislocations on basal and prismatic planes in h.c.p. metals: an atomistic study
By V. VITEK and M. IGARASHI 1059

$\langle \bar{1}\bar{1}23 \rangle \{10\bar{1}1\}$ slip in zirconium
By H. NUMAKURA, Y. MINONISHI and M. KOIWA 1077

Plastic deformation of single crystals of Ti_3Al with $D0_{19}$ structure
By Y. MINONISHI 1085

On the relative stability of the α-, β- and ω-phases in some Zr-based alloys
By D. ARIAS, M. RUCH and J. P. ABRIATA 1095

An internal friction study of Zr–2·5 wt% Nb–H alloys
By I. G. RITCHIE and Z.-L. PAN 1105

Brief reports 1115

PART B

Light intensity dependence of the photoconductivity of hydrogenated amorphous silicon
By Y. ALMERIOUH, J. BULLOT, P. CORDIER, M. GAUTHIER and G. MAWAWA 1015

Charge transport in boron-doped diamond thin films
By J. MORT, K. OKUMURA and M. MACHONKIN 1031

Twin intersections in silicon on sapphire
By J. L. BATSTONE 1037

PAGE

Investigation of the effect of an applied electric field on α-$LiIO_3$ crystals by synchrotron radiation topography
By J. Baruchel, J. Bouillot and E. Coquet 1051

An analytical expression for the energy loss of fast electrons travelling parallel to the axis of a cylindrical interface
By C. A. Walsh 1063

Short-term fatigue of photoluminescence in a-Si:H deposited at different temperatures
By M. Koós and I. Pócsik 1079

Screening effect on ⟨110⟩ high-resolution electron microscopy image of compound semiconductors
By K. Hiratsuka 1087

Time-dependent magnetic response in solids: phenomenology and physical background
By M. Földeáki, L. Kőszegi and R. A. Dunlap 1101

General features of hydrogen-induced amorphization in RM_2 (R = rare earth, M = transition element) Laves phases
By U-In Chung, Yong-Gyoo Kim and Jai-Young Lee 1119

Non-Ohmic hopping conductivity in disordered systems
By M. Mostefa, D. Bourbie and G. Olivier 1131

Bias-enhanced conductance in hydrogenated amorphous silicon films
By D. Nesheva and P. Danesh 1139

Bond ordering in amorphous $Si_{1-x}N_x$
By S. J. Gurman 1149

Empty s–d-state distributions in amorphous Ge_xSe_{1-x} alloys
By E. Belin, C. Senemaud and S. Guita 1159

NUMBER 6—JUNE

PART A

A model for ideal cleavage fracture of grain boundaries in b.c.c. metals
By D. Wolf 1117

Correlation factor for diffusion via the sublattice vacancy mechanism in DO_3-type ordered alloys
By I. A. Szabó, M. Koiwa and S. Ishioka 1137

Migration of point defects along a dissociated edge dislocation in copper: a molecular dynamics study of pipe diffusion
By Jin Huang, M. Meyer and V. Pontikis 1149

Diffusion of tin implanted in aluminium
By G. Erdélyi, K. Freitag and H. Mehrer 1167

Strain localization, slip-band formation and twinning associated with deformation of a Ti–24 at.% Al–11 at.% Nb alloy
By M. A. Morris and D. G. Morris 1175

PAGE

Plastic deformation of the intermetallic Al_3Ti
By D. G. MORRIS and R. LERF 1195

***In situ* high-resolution electron microscopy observation of the melting process of In particles embedded in an Al matrix**
By K. SASAKI and H. SAKA 1207

Cobalt disilicide growth and interface structure analyses
By C. D'ANTERROCHES MENEAU and P. PERRET 1221

High-velocity dislocations: effective mass, effective line tension and multiplication
By M. SAKAMOTO 1241

A TEM study of the crystallography and defect structures of single crystal and polycrystalline copper indium diselenide
By C. J. KIELY, R. C. POND, G. KENSHOLE and A. ROCKETT 1249

Imaging friction tracks on diamond surfaces using reflection electron microscopy (REM)
By Z. L. WANG, Z. FENG and J. E. FIELD 1275

A theory of the positive temperature dependence of yield stress in TiAl
By T. KAWABATA, T. KANAI and O. IZUMI 1291

A quantitative analysis of strong-beam α fringes from {110} antiphase boundaries in GaAs
By D. R. RASMUSSEN, S. MCKERNAN and C. B. CARTER 1299

A statistical thermodynamic derivation of the ballistic model for vacancy migration
By J. F. WAGER 1315

Direct observation of domain structures and interface dislocations in M_7C_3 by high-resolution electron microscopy
By A. Q. HE, H. Q. YE, G. VAN TENDELOO and K. H. KUO 1327

Interdiffusion-assisted dislocation migration in $GaAs/Ga_{1-x}Al_xAs$ layers on Si(001)
By D. CHERNS, D. LORETTO, N. CHAND, D. BAHNCK and J. M. GIBSON 1335

Erratum 1345

List of contents iii

PART B

Influence of substrate temperature and annealing treatments on the properties of glow-discharge and sputtered a-Si_xC_{1-x}:H films
By F. DEMICHELIS, C. F. PIRRI, E. TRESSO and G. BENEDETTO 1223

Domain wall stabilization in $Co_{74}Fe_6B_{20}$ amorphous alloys
By J. HORVAT, E. BABIĆ, Ž. MAROHNIĆ and H. H. LIEBERMANN 1235

PAGE

Investigation of discontinuous Pd films by photoelectron spectroscopy and electron microscopy
By CH. KUHRT and M. HARSDORFF 1247

Electrical conductivity of amorphous carbon and amorphous hydrogenated carbon
By D. DASGUPTA, F. DEMICHELIS and A. TAGLIAFERRO 1255

Conduction-band-edge densities in $Ga_xAl_{1-x}Sb$
By H. AOURAG, B. KHELIFA, A. BELAIDI, A. TADJER, M. REZKI and M. GAMOUDI 1267

Silicon transport during oxidation
By M. P. MURRELL, C. J. SOFIELD, and S. SUGDEN 1277

Calculation of some metallic glass properties, based on the use of a Gaussian distribution for the nearest-neighbour distance. II. Diffusion and viscosity properties
By G. KNUYT, L. M. STALS and L. DE SCHEPPER 1289

Electronic theory of metallic glass formation
By D. H. LE, C. COLINET and A. PASTUREL 1299

Vibrational excitations in a-$A_{1-x}B_xC$ alloys
By B. K. AGRAWAL and P. S. YADAV 1313

Stability of helium-filled platelets in nickel
By M. D'OLIESLAEGER, G. KNUYT, L. DE SCHEPPER and L. M. STALS 1321

Atomistic computer simulation of the growth of helium platelets in nickel
By M. D'OLIESLAEGER, G. KNUYT, L. DE SCHEPPER and L. M. STALS 1335

Long-time transient conduction in a-Si: H p–i–n devices
By R. A. STREET 1343

A structural model of the icosahedral Al_6Li_3Cu phase studied by high-resolution electron microscopy
By D. SHI, H. Q. YE, Q. B. YANG and K. H. KUO 1365

Perfect and modulated quasicrystals in the system Al–Fe–Cu
By M. AUDIER, Y. BRÉCHET, M. DE BOISSIEU, P. GUYOT, C. JANOT and J. M. DUBOIS 1375

The interpretation of the FOLZ reflection fine structure in CBED patterns of GaInAsP
By A. J. BONS, H. GONG and F. W. SCHAPINK 1395

The influence of structural vacancies and impurities on the electronic structure of TiC(100)
By D. L. NOVIKOV, A. L. IVANOVSKY and V. A. GUBANOV 1409

A quantum mechanical calculation of interatomic interactions in diamond
By P. MAHON, B. A. PAILTHORPE and G. B. BACSKAY 1419

Subject index 1431

Index of authors 1437